

Response to Office Action mailed December 21, 2004
U.S. Application No. 10/628,214

REMARKS

In the office action, the examiner rejected all 26 claims, objected to the drawings, and required correction of the abstract of disclosure.

Claim Rejections

The examiner rejected independent claims 1 and 17 as being anticipated by US patent 6,125,938 to Garcia-Soule, et al. (hereafter, "Garcia-Soule"), and rejected independent claim 15 as being obvious over US patent 5,704,426 to Rytlewski, et al. (hereafter, "Rytlewski") in view of Garcia-Soule. Applicants wish to respectfully traverse all of the examiner's claim rejections. Applicants contend that the examiner has misunderstood the teachings of Garcia-Soule and Rytlewski, or the teachings of the present application, or both.

Applicants' claim 1 reads as follows:

1. A system of two or more valves wherein said valves operate over a designated pressure interval and are arranged to actuate performance of a sequenced set of events by one or more downhole tools with the application of pressure to said valves.

Garcia-Soule teaches a control module (device 22 in his Fig. 3) combined with pressure storage devices called accumulators 36 that are controlled by the control module, the combination being adapted for downhole placement for controlling downhole tools. Garcia-Soule's control module is an electrical circuit 46. As stated at column 12, lines 4-5, Garcia-Soule's invention "permits operation of the tools to be controlled downhole by the control circuit 46." (Emphasis added) Applicants' invention can be called a remote intervention logic valve ("RILV"), and it is not a control module. It has no electrical circuits to make its logic decisions, and it has no accumulators. (The RILV is device 10 in Applicants' Fig. 1, and Fig. 2 is an RILV schematic diagram.)

The examiner's attention is directed to column 1, lines 18-25 in Garcia-Soule. The approach he discusses there is to use fluid pressure provided from the surface through a tubing string to operate downhole valves that operate a pressure-actuated

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downhole tool. In the next two sentences (lines 25-30), Garcia-Soule teaches that this approach is "not practical" where "multiple tools having multiple modes of operation are utilized." He is teaching away from Applicant's invention. The "multiple tools having multiple modes of operation" are the "performance of a sequenced set of events by one or more downhole tools" of Applicants' claim 1. Applicants have invented a way to do this within the general approach that Garcia-Soule declares to be "not practical." Applicants have invented what is "essentially a pressure driven downhole computer," a "downhole brain" that "uses pressure as the primary basis for control and actuation." (See Applicants' paragraph No. 10 at the end of the "Background" section.) The underlining is added to emphasize the primary point of differentiation from the disclosures of Garcia-Soule.

The examiner is further directed to Applicants' paragraph No. 25 (beginning "The use of electricity downhole . . ."), wherein Applicants list no fewer than six "primary limitations associated with the use of electricity for the control and actuation of downhole devices." Thus, both the difference in Applicants' solution and the reasons for it are made clear by the two patent documents themselves.

Garcia-Soule distinguishes the type of approach that includes Applicants' invention from his own invention with the words "In some circumstances, fluid pressure may be applied directly to a pressure actuated tool in a well." This occurs at column 1, lines 19-20 (and the circumstances he would limit this approach to are, as discussed above, a single operation such as opening a valve). Applicants' claim 1 uses similar words to limit Applicants' claimed system of valves (i.e., the RILV in some embodiments), the phrase being "with the application of pressure to said valves." Garcia-Soule would understand this limitation in Applicants' claim 1 to prevent the claim from reading on his disclosed invention. Others trained in the art would have the same understanding. It should also be noted that a reader might find a basis in Garcia-Soule to conclude that the inventors have disclosed "a system of two or more valves." (Quotation from Applicants' claim 1.) However the valves in Garcia-Soule are merely the means by which a decision made by the control circuit 46 is communicated to the downhole tools. In contrast, Applicants' "system of two or more valves" are the

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decision-making "brain" of Applicants' invention. Applicants' system of two or more valves indeed "actuate performance of a sequenced set of events by one or more downhole tools," whereas, the valves in Garcia-Soule are merely the conduit for such actuation. Stating this another way, Applicants' invention can be viewed as taking the system of valves that Garcia-Soule needs and designing it in a much more sophisticated, but still practical, way such that it eliminates the need for Garcia-Soule's downhole electrical control circuit and downhole pressure storage devices (accumulators).

Applicants' claim 17 is the corresponding independent apparatus claim:

17. An apparatus for actuating performance of a sequenced set of events by one or more downhole tools with the application of pressure over a designated pressure interval comprising a combination of two or more valves arranged as sub-assemblies wherein one sub-assembly communicates with another sub-assembly through pressure isolating connections.

Attention is directed to the sub-assemblies and pressure isolating connections specified in Applicants' claim. The brain, so to speak, of Garcia-Soule's invention is his electrical control circuit 46, and accordingly he has no need for and does not teach or suggest using pressure-isolating connections between sub-assemblies. In fact, he has no need for and does not teach or suggest sub-assemblies, because he has no need to provide housings for a pressure-activated system of valves that do the downhole thinking.

Applicants wish to amend claim 17 for reasons unrelated to prior art, but instead merely to clarify that the claim conforms to the terminology used in the Specification. Instead of "two or more valves arranged as sub-assemblies," Applicants wish to say "two or more valves arranged within sub-assemblies." Support for this amendment may be found at paragraph 50 where it is made clear that the sub-assemblies house the various valves.

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It follows from the preceding discussion that Garcia-Soule cannot anticipate either claim 1 or claim 17 of the present application. Therefore, it further follows that all claims depending on these independent claims are allowable.

The examiner rejects independent method claim 15 as obvious over Rytlewski in view of Garcia-Soule. The examiner correctly notes that Rytlewski fails to teach the following limitation in claim 15: "wherein at least one of said steps is actuated by a system of valves that operates over a designated pressure interval and is arranged to actuate performance of said step with the application of pressure to said valves." The examiner relies on Garcia-Soule to supply this teaching, i.e., to teach the system of valves of Applicants' claim 1 as a means to perform the perforation operation. As stated previously, Garcia-Soule does not disclose or suggest Applicants' system. Therefore, claim 15 and its dependent claim 16 are allowable.

CONCLUSION

Each of the claims of the application is limited to Applicants' invention for controlling downhole tools by a pressure driven system of valves. Each of these claims is believed to be patentably distinct from all known prior art, including all art cited by the examiner. Therefore, Applicants respectfully request allowance of all pending claims, as amended herein. Applicants believe that no corrections are required to the drawings and that the present amendment to the Abstract corrects its problem.

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If the examiner wishes to discuss this application with counsel, please contact
the undersigned.

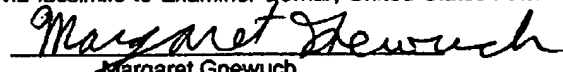
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AMENDMENTS TO THE DRAWINGS:

The examiner objects to the drawings because they do not show the underlined features in claims 6 and 7:

6. The system of Claim 1 wherein said valves operate one or more remote electrical devices that communicate with a command base via a wireline.
7. The system of Claim 1 wherein said valves operate one or more remote electrical devices that are powered at a remote location without requiring wireline support.

Neither the command base or the wireline or the remote location are part of the claimed invention. Nor, in fact, are the "remote electrical devices." An example of such a remote electrical device is an electrically powered perforating device that would carry out the perforation operation mentioned in paragraph 35 under the control of Applicant's RILV. Such a device is merely one example of the "one or more downhole tools" of claim 1 which are actuated by Applicants' invention but are not part of Applicants' invention. The underlined words in claim 6 merely indicate that the perforating device receives electrical power from the surface, and the underlined words in claim 7 address (for example) battery-powered perforating devices. In fact, Applicants' Fig. 5 shows the wireline 58 extending from the surface inside coiled tubing, and feature 56 is the extension wire that passes through the RILV down to where remote electrical devices such as perforating guns would utilize it. Applicants do not believe that such remote unclaimed features need to be shown or would be of any help to the reader. Applicants would be willing to amend claims 6 and 7 to insert the words "are adapted to" before "operate one or more electrical devices" to emphasize the extent of what is being claimed. Applicants think this unnecessary, but suggest it if the examiner is still dissatisfied.

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